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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/542,909 | 07/20/2005 | Guofu Zhou | NL 030925 | 1799 |

24737 7590 03/29/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

| EXAMINER | |
|---|---|
| CARTER III, ROBERT E | |
| ART UNIT | PAPER NUMBER |
| 2609 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 03/29/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/542,909 | ZHOU ET AL. | |
| | Examiner | Art Unit | |
| | Robert E. Carter | 2609 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 5/30/2006.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 recites the limitation "further comprising a shaking pulse in-between the reset pulse and the drive pulse". Claims 1 and 4, upon which claim 9 depends, state the reset pulse is to be successively followed by the drive pulse. The above limitation of claim 9 inserts a shaking pulse between the reset pulse and the drive pulse, such that the reset pulse is no longer successively followed by the drive pulse. Therefore, the above limitation in claim 9 contradicts claims 1 and 4 upon which it depends.

3. Claim 10 recites the limitation "further comprising a shaking pulse in-between the first mentioned reset pulse and the drive pulse". Claims 1, 4 and 6, upon which claim 10 depends, state the first mentioned reset pulse is to be successively followed by the drive pulse. The above limitation of claim 10 inserts a shaking pulse between the first mentioned reset pulse and the drive pulse, such that the first mentioned reset pulse is no longer successively followed by the drive pulse. Therefore, the above limitation in claim 10 contradicts claims 1 and 4 upon which it depends.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 11, 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Katase (US Patent # 6,762,744).

As for claims 1, 16, and 17,

Katase teaches:

A method for driving, and a display apparatus comprising, a drive circuit (Fig. 3) for driving an electrophoretic display (Fig. 1&2) having pixels (Fig. 1&2, #11C), the drive circuit comprising a driver (Fig. 3, #140A) for supplying, during an image update period (Fig. 28, [Pulse preceding T1-T4]) wherein the pixels are addressed to refresh an image displayed, a drive waveform (Fig. 28, #Xj) to an associated one of the pixels, the drive waveform comprising successively a first pulse (Fig. 28, Pulse preceding T1) with a first voltage level (Fig. 28, #+V100), and a drive pulse (Fig. 28, # Tdv, Tds, Tdb) having a second voltage level (Vdij, Vdsij, Vcom) to obtain a desired intermediate optical state of the associated one of the pixels (Fig. 28, #Iij[T3]), an absolute value of the second voltage level being smaller than an absolute value of the first voltage level (Fig. 28, |+Vdij| < |+V100|).

As for claim 2,

Katase teaches:

A drive circuit as claimed in claim 1, wherein the driver (Fig. 3, #140A) is arranged for supplying during the image update period (Fig. 28, [Pulse preceding T1-T4]) the drive waveform (Fig. 28, #Xj) wherein the first voltage level (Fig. 28, #+V100) is substantially constant over time. Fig. 28 shows the first signal maintaining a constant voltage level of +V100 over time until the second pulse begins at T1.

As for claim 3,

Katase teaches:

A drive circuit as claimed in claim 1, wherein the driver (Fig. 3, #140A) is arranged for supplying during the image update period (Fig. 28, [Pulse preceding T1-T4]) the drive waveform (Fig. 28, #Xj) wherein the second voltage level (Vdij, Vdsij, Vcom) has a variable level being controlled to obtain the intermediate optical state (Fig. 28, Vdsij > Vcom > Vdij).

As for claim 4 and 11,

Katase teaches:

A drive circuit as claimed in claim 1, wherein the driver (Fig. 3, #140A) is arranged for supplying during the image update period (Fig. 28, [Pulse preceding T1-T4]) the drive waveform (Fig. 28, #Xj) wherein the first pulse is a reset pulse (Abstract, lines 2-6, Fig. 28, Pulse preceding T1) having an energy level (Fig. 28, #+V100) and a duration longer than required (Col. 6, lines 18-20) for changing a present optical state of the associated one of the pixels (Fig. 1&2, #11C) to one of two extreme optical states (Fig. 28, #Iij[T1]). A reset pulse that will initialize a pixel from any starting state inherently has a duration longer than required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katase (US Patent # 6,762,744).

As for claims 12-15,

Katase teaches all the limitations of claim 1, and also teaches:

A power supply (Col. 6, lines 53-54).

An integrated circuit comprising the drive circuit as claimed in claim 1 (Fig. 3) wherein the second voltage level (Vdij, Vdsij, Vcom) is a variable level, and wherein the integrated circuit comprises the driver (Fig, 3, #140A) for controlling the variable level to obtain the desired intermediate optical state (Fig. 28, Vdsij > Vcom > Vdij).

Katase does not teach:

Wherein the integrated circuit comprises a power supply input (PSI) for receiving a power supply voltage (PSV1), the voltage level (+VM, -VM) of the first pulse (R.i, Si) being substantially equal to the power supply voltage (PSV1), a further power supply input (PS2) for receiving a further power supply voltage (PSV2), a level of the first mentioned power supply voltage (PSV1) being higher than a level of the further power supply voltage (PSV2), and wherein the integrated circuit comprises the driver (10) for using the first mentioned power supply voltage (PSV1) to generate the first pulse (Ri, Si)

and for using the further power supply voltage (PSV2) to generate the drive pulse (Di), wherein the power supply input (PSI) is arranged for receiving the power supply voltage (PSV1) being a voltage with the largest absolute value received by the integrated circuit.

However, as shown above in the rejection of claim 1 of the instant application, Katase discloses a driver circuit and drive waveform with the same first pulse with the same first voltage level, and the same drive pulse with the same second voltage level as required above and which correspond directly to the power supply voltage (PSV1) and further power supply voltage (PSV2). Katase further discloses that a power supply is required but not shown (Col. 6, lines 53-54). While Katase is silent on the voltage output of this required supply, because Katase discloses all of the voltage levels required for operation of the driver circuit, at the time of the invention it would have been obvious to one of ordinary skill in the art to make the power supply required but not shown in Katase to output the voltage levels required for operation of the driver circuit in Katase and to modify the driver circuit by adding a power supply input to accept these voltage levels enabling a direct coupling of the power supply to the driver circuit without any transformers in between to maximize efficiency and minimize cost.

6. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katase (US Patent # 6,762,744) in view of Machida et al. (US Patent #6,753,844).

As for claim 5,

Katase teaches all the limitations of claims 1:

However, Katase does not teach that the first pulse is a shaking pulse with an energy level too low to change a pixel to one of the extreme states.

Machida et al. teaches:

An electrophoretic display (Col. 1, lines 15-20, Fig. 2) wherein the driver (Fig. 12, #14, 16) is arranged for supplying during the image update period (Fig. 9, Time[0-Beginning of 2nd initializing drive]) the drive waveform (Fig. 9) wherein the first pulse is a shaking pulse (Fig. 9, First 4.5 periods of the initializing drive) comprising at least one sub-pulse having the first voltage level (Col. 6, lines 52-55, Col. 7, lines 24-27), and having the energy for changing the optical state of the associated one of the pixels (Fig. 12, #44), the energy being too low to change one of two extreme optical states of the associated one of the pixels to the other extreme optical state (Col. 6, lines 52-55). As according to the specification of Machida (Col. 7, lines 24-27), the first 4.5 periods of the initializing drive are to have a voltage less than the display drive voltage and the last negative pulse of the initializing drive is to have a voltage higher than the display drive voltage. Therefore, because both Machida et al. and the Katase are in the same field of endeavor, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the reset pulse in Katase with the fist two pulses of the initializing drive in Machida et al. in order to improve the contrast ratio (Col. 3, lines 18-35).

As for claim 6 and 8,

Katase teaches all the limitations of claims 4:

However, Katase does not teach a shaking pulse preceding a further reset pulse preceding the first reset pulse, and having a polarity opposite the first reset pulse.

Machida et al. teaches:

An electrophoretic display (Col. 1, lines 15-20, Fig. 2) wherein the driver (Fig. 12, #14, 16) is arranged for supplying during the image update period (Fig. 9, Time[0-Beginning of 2nd initializing drive]) the drive waveform (Fig. 9) further comprising a shaking pulse (Fig. 9, First 4.5 periods of the initializing drive) preceding a further reset pulse (Fig. 9, Last negative pulse of the initializing drive) preceding the first mentioned reset pulse, and having a polarity opposite to a polarity of the first mentioned reset pulse (Fig. 9, V[Last negative pulse of the initializing drive] = -300). As according to the specification of Machida (Col. 7, lines 24-27), the first 4.5 periods of the initializing drive are to have a voltage less than the display drive voltage and the last negative pulse of the initializing drive is to have a voltage higher than the display drive voltage.

Therefore, because both Machida et al. and the Katase are in the same field of endeavor, and because both disclose a reset pulse preceding a drive pulse, at the time of the invention It would have been obvious to place the initializing drive in Machida et al. before the first reset pulse in Katase, yielding a shaking pulse preceding a further reset pulse with an opposite from the first reset pulse polarity preceding the first reset

pulse, in order to retain the benefits of the first reset pulse while still improving the contrast ratio (0Col. 3, lines 18-35).

As for claim 7,

Katase teaches all the limitations of claims 4:

However, Katase does not teach a shaking pulse preceding the reset pulse.

Machida et al. teaches:

An electrophoretic display (Col. 1, lines 15-20, Fig. 2) wherein the driver (Fig. 12, #14, 16) is arranged for supplying during the image update period (Fig. 9, Time[0-Beginning of 2nd initializing drive]) the drive waveform (Fig. 9) further comprising a shaking pulse (Fig. 9, First 4.5 periods of the initializing drive) preceding a reset pulse (Fig. 9, Last negative pulse of the initializing drive). As according to the specification of Machida (Col. 7, lines 24-27), the first 4.5 periods of the initializing drive are to have a voltage less than the display drive voltage and the last negative pulse of the initializing drive is to have a voltage higher than the display drive voltage.

Therefore, because both Machida et al. and the Katase are in the same field of endeavor, and because both disclose a reset pulse preceding a drive pulse, at the time of the invention It would have been obvious to place first 4.5 periods of the initializing drive in Machida et al. before the reset pulse in Katase in order to retain the benefits of the reset pulse while still improving the contrast ratio (Col. 3, lines 18-35).

7. Claims 5, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katase (US Patent # 6,762,744) in view of Erhart et al. (US Patent #6,201,522).

As for claims 5 and 7,

Katase teaches all the limitations of claim 1:

However, Katase does not teach that the first pulse is a shaking pulse with an energy level too low to change a pixel to one of the extreme states.

Erhart et al. teaches:

A power saving drive circuit for a flat panel display (Col. 1, lines 15-20, Fig. 2) wherein the driver (Fig. 2, #28, 33) is arranged for supplying during the image update period (Col.1, lines 40-48) the drive waveform (Fig. 5, Voltage on column 2) wherein the first pulse is a shaking pulse (Fig. 5, Voltage on column 2[t0-t1]) comprising at least one sub-pulse having the first voltage level (Fig. 5, Median bias), and having the energy for changing the optical state of the associated one of the pixels (Fig, 2, Intersection of R1 & C1), the energy being too low to change one of two extreme optical states of the associated one of the pixels to the other extreme optical state (Col. 5, lines 63-66). Therefore, because both Erhart et al. and the Katase are in the same field of endeavor, at the time of the invention it would have been obvious to one of ordinary skill in the art

to modify the first pulse in Katase with the pulse in Erhart et al. in order to save power and make the display more efficient.

It would further have been obvious to place the pulse in Erhart before the reset pulse in Katase in order to retain the benefits of the reset pulse while still saving power.

## *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Nomura et. al. (US Patent #6,236,385) discloses a LCD driving method.

Albert et. al. (US Patent #6,249,271) discloses an electrophoretic display.

Kuijk (US Patent #5,151,691) discloses a display driving method.

Disanto et. al. (US Patent #5,412,398) discloses an electrophoretic display and power supply.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert E. Carter whose telephone number is 571-270-3006. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on 571-272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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